

### AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A cell core transformer having significantly reduced leakage inductance between the primary and secondary windings, said transformer having a substantially flat surface and circuit components associated with said transformer mounted directly onto said flat surface comprising:

a. a slab of ferromagnetic magnetic material having a series of rows and columns of spaced via holes therethrough;

b. a first primary conductor extending through a first single one of said via holes formed in one of said rows of spaced via holes in said slab of ferromagnetic material for carrying current to create a magnetic field within a portion of the ferromagnetic material proximally encompassing said via hole;

c. a second primary conductor extending through a second single one of said via holes formed in said slab of ferromagnetic material, said second via hole being adjacent to said first via hole and in the same row of spaced via holes as said first via hole;

d. a third primary conductor extending through a third single one of said via holes formed in said slab of ferromagnetic material, said third via hole being adjacent to said second via hole and in the same column as said second via hole;

e. a fourth primary conductor extending through a fourth single one of said via holes formed in said slab of ferromagnetic material, said fourth via hole being in the same column as said first via hole and in the same row as said third via hole so that said fourth via hole is adjacent to both said first and third via holes;

f. [[d.]] said first, ~~and~~ second, third and fourth primary conductors coupled together so that the direction of current flowing in said first and third vias is opposite to the direction of current flow in said second and fourth vias whereby resulting flux generated between ~~said first and second~~ each via has the same orientation where the ~~two~~ four adjoining magnetic fields intersect;

--g.--[[e.]] a first secondary conductor in said slab of ferromagnetic material physically extending through the same single via hole as said first primary conductor,

whereby a voltage is induced in said first secondary conductor by the magnetic flux produced by current flowing in said first primary conductor;

h. [[f.]] a second secondary conductor physically extending through the same single via hole in said slab of ferromagnetic material as said second primary conductor, whereby a voltage is induced in said second secondary conductor by the magnetic flux produced by current flowing in said second primary conductor;

i. a third secondary conductor physically extending through the same single via hole as said third primary conductor, whereby a voltage is induced in said third secondary conductor by the magnetic flux produced by current flowing in said third primary conductor;

j. a fourth secondary conductor physically extending through the same single via hole as said fourth primary conductor, whereby a voltage is induced in said fourth primary conductor by the magnetic flux produced by current flowing in said fourth primary conductor;

k. [[g.]] said primary conductors coupled together and said secondary conductors coupled together to provide a desired turns ratio for said cell transformer; and

l. [[h.]] electrical printed circuits formed on top and bottom surfaces of the slab having circuits in electrical contact with said first and second primary conductors and said first and second secondary conductors.

2. (Currently Amended) A cell core transformer having a substantially flat surface and circuit components associated with said transformer mounted directly onto said flat surface comprising:

a. a slab of ferromagnetic magnetic material having a series of rows and columns of spaced via holes therethrough;

b. a plurality of primary conductors respectively extending through said via holes so that current through said conductors creates a plurality of respective magnetic fields within a portion of the ferromagnetic material proximally encompassing said via holes;

c. a plurality of secondary conductors respectively physically extending through the same via holes ~~as via holes~~ in which said primary conductors extend;

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d. said primary conductors coupled together and said secondary conductors coupled together to (i) arrange the pattern of current flow so that the current flowing in any single via will be in the opposite direction from the current flowing in any adjacent via in its same row or column of said spaced via holes and (ii) provide a desired turns ratio for said cell transformer; and

e. electrical printed circuits formed on top and bottom surfaces of the slab having circuits in electrical contract with said primary and secondary conductors.

3. (Original) The cell core transformer according to claim 2 wherein said plurality of primary conductors are coupled together so that current flow through any via is opposite to the current flow through its adjacent vias whereby the resulting flux generated between proximate vias has the same orientation where adjoining magnetic fields intersect.

4. (Original) The cell core transformer according to claim 2 wherein said plurality of secondary conductors are coupled in series.

5. (Original) The cell core transformer according to claim 2 wherein said plurality of secondary conductors are coupled in parallel.

6. (Original) The cell core transformer according to claim 2 having  $x+y$  secondary conductors,  $x$  number of said secondary conductors being coupled in series and  $y$  number of conductor are coupled in series, said series connected  $x$  conductors and said series connected  $y$  conductors being coupled together in parallel to provide a step-down transformer.

7. (Original) The cell core transformer according to claim 2 having  $b+c$  primary conductors and  $x+y$  secondary conductors,  $b$  number of said primary conductors being coupled in series, and said  $c$  number of said primary conductors being coupled in series;

said series connected  $b$  conductors and said series connected  $c$  being conductors coupled in parallel;

$x$  number of secondary conductors being coupled in series, said  $y$  number of secondary conductors being coupled in series;  
said series connected  $x$  conductors and said series connected  $y$  conductors coupled in parallel to provide a selected turns-ratio transformer.

8-10. (Cancelled)

11. (Currently Amended) A cell core transformer encapsulated between printed circuitry having a substantially flat surface and circuit components associated with said transformer mounted directly on to said flat surface comprising:

- a. a slab of magnetic material having a series of spaced holes therethrough;
- b. a first conductor passing through only one of said holes;
- c. a second conductor physically passing through the same hole ~~said that said first conductor passes through, hole~~[[s]], the second conductor being electrically insulated from the first conductor; ~~and~~
- d. electrical printed circuits formed on top and bottom surfaces of the slab, the printed circuits in electrical contact with the first and second conductors;[[.]]
- e. an additional hole through said printed circuitry outside the boundary of said slab of magnetic material; and
- f. a plated via formed in said additional hole in electrical contact with one of said electrical printed circuits.

12. (Currently Amended) A cell core transformer encapsulated between printed circuitry comprising:

- a. a member including a magnetic material, having a series of spaced holes through at least a portion of said magnetic material;
- b. a first conductor passing through only one of said holes;
- c. a second conductor physically passing through ~~said the same hole~~[[s]] that said first conductor passes through, the second conductor being electrically insulated from the first conductor; ~~and~~
- d. electrical printed circuits formed on top and bottom surfaces of the slab, the printed circuits in electrical contact with the first and second conductors;[[.]]
- e. an additional hole through said printed circuitry outside the boundary of said slab of magnetic material; and
- f. a plated via formed in said additional hole in electrical contact with one of said electrical printed circuits.

13. (Currently Amended) A cell core transformer having significantly reduced leakage inductance between the primary and secondary windings, said transformer having a substantially

flat surface and circuit components associated with said transformer mounted directly onto said flat surface comprising:

- a. a slab of ferromagnetic magnetic material having a series of rows and columns of spaced via holes therethrough;
- b. a first primary conductor extending through a first single one of said via holes formed in said slab of ferromagnetic material for carrying current to create a magnetic field within a portion of the ferromagnetic material proximally encompassing said via hole;
- c. a second primary conductor extending through a second single one of said via holes formed in said slab of ferromagnetic material, said second via hole being adjacent to said first via hole;
- d. said first and second primary conductors coupled together so that the direction of current flowing in said first via is in the same direction of current flow in said second via whereby resulting flux generated between said first and second via have opposing orientation where the two adjoining magnetic fields intersect;
- e. a first secondary conductor in said slab of ferromagnetic material physically extending through the same single via hole as said first primary conductor, whereby a voltage is induced in said first secondary conductor by the magnetic flux produced by current flowing in said first primary conductor;
- f. a second secondary conductor physically extending through the same single via hole in said slab of ferromagnetic material as said second primary conductor, whereby a voltage is induced in said second secondary conductor by the magnetic flux produced by current flowing in said second primary conductor;

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g. said primary conductors coupled together and said secondary conductors coupled together to provide a desired turns ratio for said cell transformer; and

h. electrical printed circuits formed on top and bottom surfaces of the slab having circuits in electrical contact with said first and second primary conductors and said first and second secondary conductors;[[.]]

i. an additional hole through said printed circuitry outside the boundary of said slab of magnetic material; and

j. a plated via formed in said additional hole in electrical contact with one of said electrical printed circuits.

14. (Previously Presented) The cell core transformer according to Claim 2 wherein said plurality of primary conductors are coupled together so that current flow through any via is the same as the current flow through its adjacent vias whereby the resulting flux generated between proximate vias have opposing orientation where adjoining magnetic fields intersect.

15. (Previously Presented) The cell core transformer according to Claim 2 wherein said plurality of secondary conductors are connected by said electrical printed circuits.

16. (Previously Presented) The cell core transformer according to Claim 2 wherein said plurality of secondary conductors are connected in series or parallel by said electrical printed circuits.

17. (Previously Presented) The cell core transformer according to Claim 2 having  $b+c$  primary conductors and  $x+y$  secondary conductors, where either  $b$  or  $c$  can be zero conductors and either  $x$  or  $y$  can be zero conductors,  $b$  number of said primary conductors being coupled in series,  $c$  number of said primary conductors being coupled in series;

said series connected  $b$  conductors and said series connected  $c$  conductors being coupled in parallel;

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x number of secondary conductors being coupled in series, said y number of secondary conductors being coupled in series;

said series connected x conductors and said series connected y conductors being coupled in parallel to provide a selected turns-ratio transformer.